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Hyperloop's Real Problem

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Most reviews of Elon Musk's hyperloop plan focus on technical questions. Will it cost as little as he estimates? Could it move as fast as he projects? Could the system work at all?

None of these are the real problem with the hyperloop. The real problem is how an infrastructure-heavy, point-to-point system can possibly compete with personal vehicles that can go just about anywhere—the United States has more than 4 million miles of public roads—or with an airline system that requires very little infrastructure and can serve far more destinations than the hyperloop.

Musk promises the hyperloop will be fast. But fast is meaningless if it doesn't go where you want to go. Musk estimates that people travel about 6 million trips a year between the San Francisco and Los Angeles urban areas, where he wants to build his first hyperloop line. But these urban areas are not points: they are huge, each covering thousands of square miles of land.

Airlines deal with these large areas through multiple airports. The Los Angeles area has five commercial airports and San Francisco has three. The hyperloop would only have one station in each region, making it inconvenient for the vast majority of people.

Moreover, airplanes from these airports can reach hundreds of other airports across the country and around the world. Even if Musk's optimistic cost estimates are valid (and remember, the first cost estimate for California high-speed rail was about \$10 billion, less than a tenth of the current estimate), the hyperloop would require billions of dollars spent on more infrastructure to add any new city.

Musk admits that hyperloops would not be competitive with air travel over long distances, so there is no chance for there ever being a coast-to-coast hyperloop or a truly national hyperloop system. This greatly limits its utility.

The major bottleneck to our airport system today is security that requires people to arrive well in advance of airplane departures. For the cost of the hyperloop between two cities, we could greatly accelerate security systems at all of our airports.

Musk hopes that the hyperloop's speed advantage will make up for the lack of convenient stations. But airplanes have a speed advantage over driving, yet the average American travels three times as many intercity miles on the highway as in the air. Similarly, the 268-mph Shanghai Maglev runs mostly empty because it doesn't go where people want to go. Cars have a huge convenience advantage, going from where you are to exactly where you want to go when you want to go there.

Our highway system is already built, and—unlike various high-speed rail projects—it was largely paid for by users out of gas taxes, tolls, or other user fees. Any new roads we build connect seamlessly with the existing system without the addition of expensive new technologies.

Moreover, new vehicle technologies will greatly increase highway capacities so we won't need to build a lot more. Adaptive cruise control promises to relieve up to half the congestion on the limited-access freeways that carry a third of our highway travel. Adaptive traffic signals promise to relieve congestion on the unlimited-access arterials and collectors that support another third of road travel. In the long run, self-driving cars will dramatically increase all road capacities because computers have much faster reflexes than humans, and most congestion is due to slow human reflexes.

Musk sees the hyperloop as an alternative to high-speed rail. But that's like comparing a Missouri fox trotter with a Tennessee walking horse: one might be a little faster or a little more elegant than the other, but neither is a viable option for everyday transportation today.

Despite the hype written about high-speed trains in Asia and Europe, they have mainly served to attract passengers from low-speed trains, not get people out of their cars or airplanes. Just about every country that has built high-speed trains has nevertheless seen rail's share of passenger travel decline as more people drive or fly.

Musk is welcome to spend his own or other private investors' money chasing this dream. But the truth is that, whether it is high-speed rail, maglev, or the hyperloop, point-to-point mass transit that requires a lot of new infrastructure simply makes no sense.

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